PB86-224870

Superfund Record of Decision (EPA Region 5)
Novaco Industries Site
Temperance, Michigan, June 1986

(U.S.) Environmental Protection Agency
Washington, DC

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EPA/ROD/R05-86/032
June 1986

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EPA

Superfund Record of Decision:

Novaco Industries, MI

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

Novaco Industries is a one-building facility that occupies a 2.6-acre rectangular parcel of land, located at 9411 Summerfield Road, at the intersection of Summerfield and Piehl, Temperance, Michigan. The site lies 50 miles south of Detroit and 5 miles north of Toledo, Ohio. The Novaco Industries study area consists of Novaco Industries, Veterans of Foreign Wars (VFW) Post 9656 and the Moyer residential property. A below-ground plating tank located within the Novaco Industries building leaked an unknown quantity of chromic acid into the ground water on or before June 13, 1979. Within 24 days following Novaco Industries' detection of the leak, chromium was discovered in Novaco's 20-foot well, as well as the VFW Post's well which was screened in both the shallow and deep aquifer. A year later, chromium was detected in a residential well west of the VFW Post.

An extraction wellfield, a treatment plant consisting of electrochemical reduction, precipitation, filtration, and ion exchange polishing units, and a pipeline to convey treated ground water to Indian Creek will be constructed onsite and on the adjoining properties in order to implement the selected remedial alternative. Approximately 36 million gallons of contaminated ground water will be extracted from the sand/gravel aquifer over a 4-year period. The extracted ground water will be treated onsite to remove trivalent and hexavalent chromium and will then be discharged into Indian Creek,
(See Attached Sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Novaco Industries, MI Contaminated Media: gw Key contaminants: chromium		

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Novaco Industries, MI

16. ABSTRACT (continued)

applying the milestone approach. Total capital cost for the selected remedial action is estimated to be $560,000 with total O&M costs approximately $419,000 for a 6-year period.

Record of Decision

Remedial Alternative Selection

Site: Novaco Industries, Temperance, Michigan

Documents Reviewed

I have reviewed the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Novaco Industries site:

- Novaco Industries Remedial Investigation Report
- Novaco Industries Feasibility Study

Description of Selected Remedy

- Groundwater Extraction
- Onsite Treatment of Groundwater and Discharge
- Operation and Maintenance
  - Onsite Treatment
  - Groundwater Extraction
  - Groundwater Monitoring
  - Abandon Monitoring Wells

Declarations

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined that Groundwater Extraction to Below Drinking Water Standards with Onsite Treatment and Discharge at Novaco Industries is a cost-effective remedy that provides adequate protection of public health, welfare and the environment. The State of Michigan has been consulted and agrees with the approved remedy. In addition, the action will require future operation and maintenance activities to ensure the continued effectiveness of the remedy. These activities will be considered part of the approved action and eligible for Trust Fund monies for a period of 1 year.

June 27th, 1986
Date

Valdas V. Adamkus
Regional Administrator

Summary of Remedial Alternative Selection
Novaco Industries
Temperance, Michigan

Site Location and Description

Novaco Industries is a one-building facility located at 9411 Summerfield Road, at the intersection of Summerfield and Piehl, Temperance, Michigan. The site lies 50 miles south of Detroit and 5 miles north of Toledo, Ohio (see figure 1), and one mile north of Lambertville and 4 miles west of Temperance (see figure 2). The facility occupies a 2.6-acre rectangular parcel.

The Novaco Industries study area consists of Novaco Industries, Veterans of Foreign Wars (VFW) Post 9656 and the Moyer residential property (see figure 3).

The site geology consists of glacial outwash sands and gravels overlying limestone bedrock at an approximate depth of 25 feet. The weathered limestone zone is underlain by relatively competent limestone. Groundwater occurs in both the shallow sand and gravel/weathered limestone aquifer and the deeper competent limestone aquifer. There is a hydraulic potential for downward leakage into the limestone aquifer which is intensified by the lack of a clay or impervious till layer separating the aquifers. The flow direction in both aquifers is toward the north, northwest.

The site is bordered on the north, east and south by residential and agricultural areas and on the west by the Veterans of Foreign Wars (VFW) Post 9656. The study area is relatively flat and grasscovered.

There is no public sewer or water within one mile of the Novaco Industries study area. Approximately 85 residences, located within 1/2 mile of the site, have private wells and septic tanks. In the downgradient groundwater flow direction and within 1,000 feet of Novaco Industries, there are eight homes and businesses that have individual water supply wells located in the sand/gravel aquifer or the limestone aquifer, or are screened across both aquifers.

Site History

A below-ground plating tank located within the Novaco Industries building leaked an unknown quantity of chromic acid into the groundwater on or before June 13, 1979. Within 24 days following Novaco Industries detection of the leak, chromium was discovered in Novaco's 20-foot-deep well, as well as the VFW Post's well which is screened in both the shallow and deep aquifer. A year later, chromium was detected in the residential well west of the VFW Post. This well was also screened in both aquifers. All the contaminated wells have been replaced with deeper wells in the competent limestone aquifer.

A groundwater extraction and treatment program was undertaken by Novaco Industries from July to November 1979. Approximately 122,000 gallons of contaminated groundwater were extracted from the VFW Post's contaminated well and Novaco Industries' contaminated well, treated onsite using a chemical reduction process, and discharged into the ditch alongside Piehl Road. The extraction and treatment operation was discontinued by Novaco Industries before all the chromium had been removed from the aquifer.

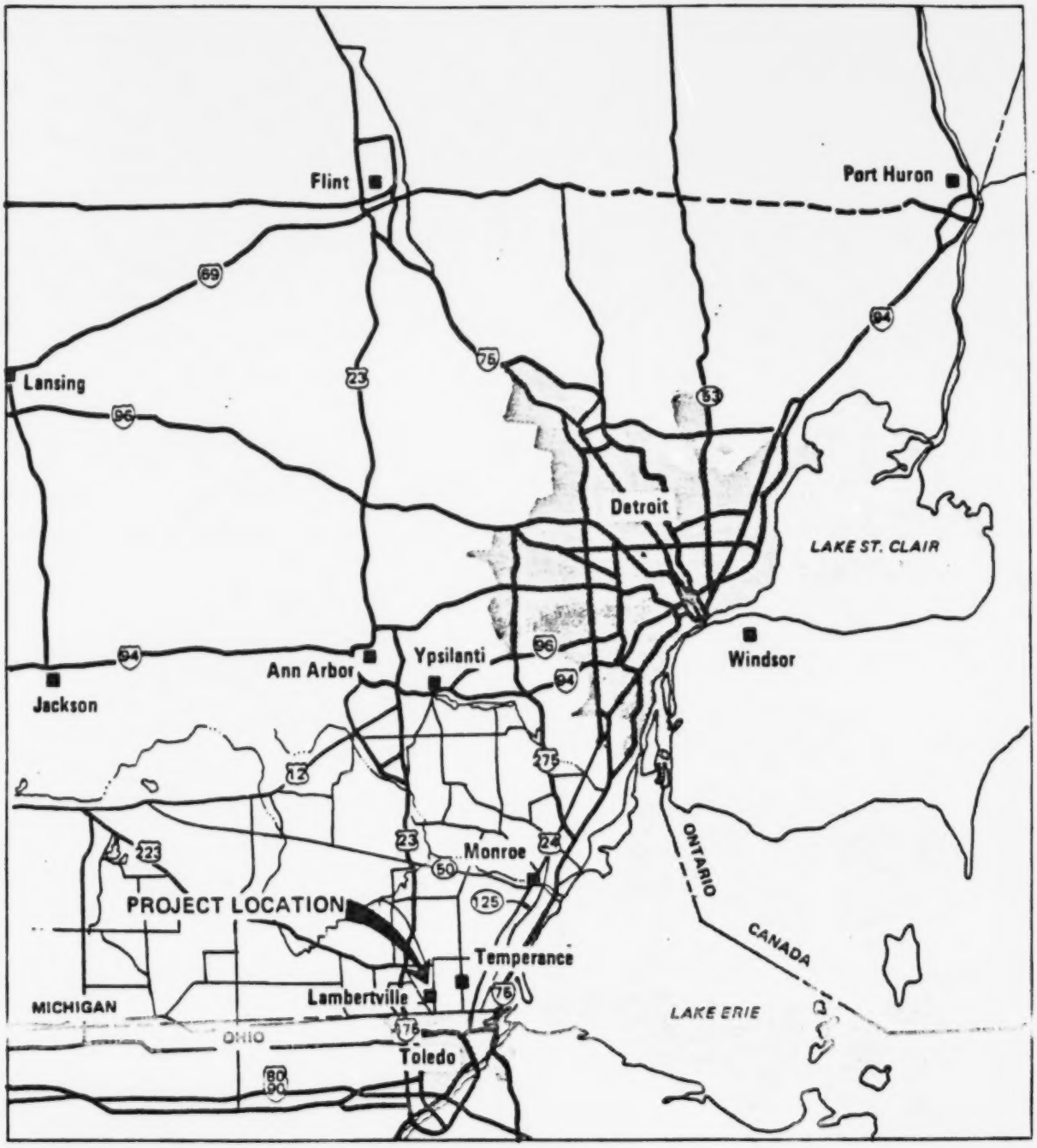

FIGURE 1
LOCATION MAP
NOVACO INDUSTRIES FS

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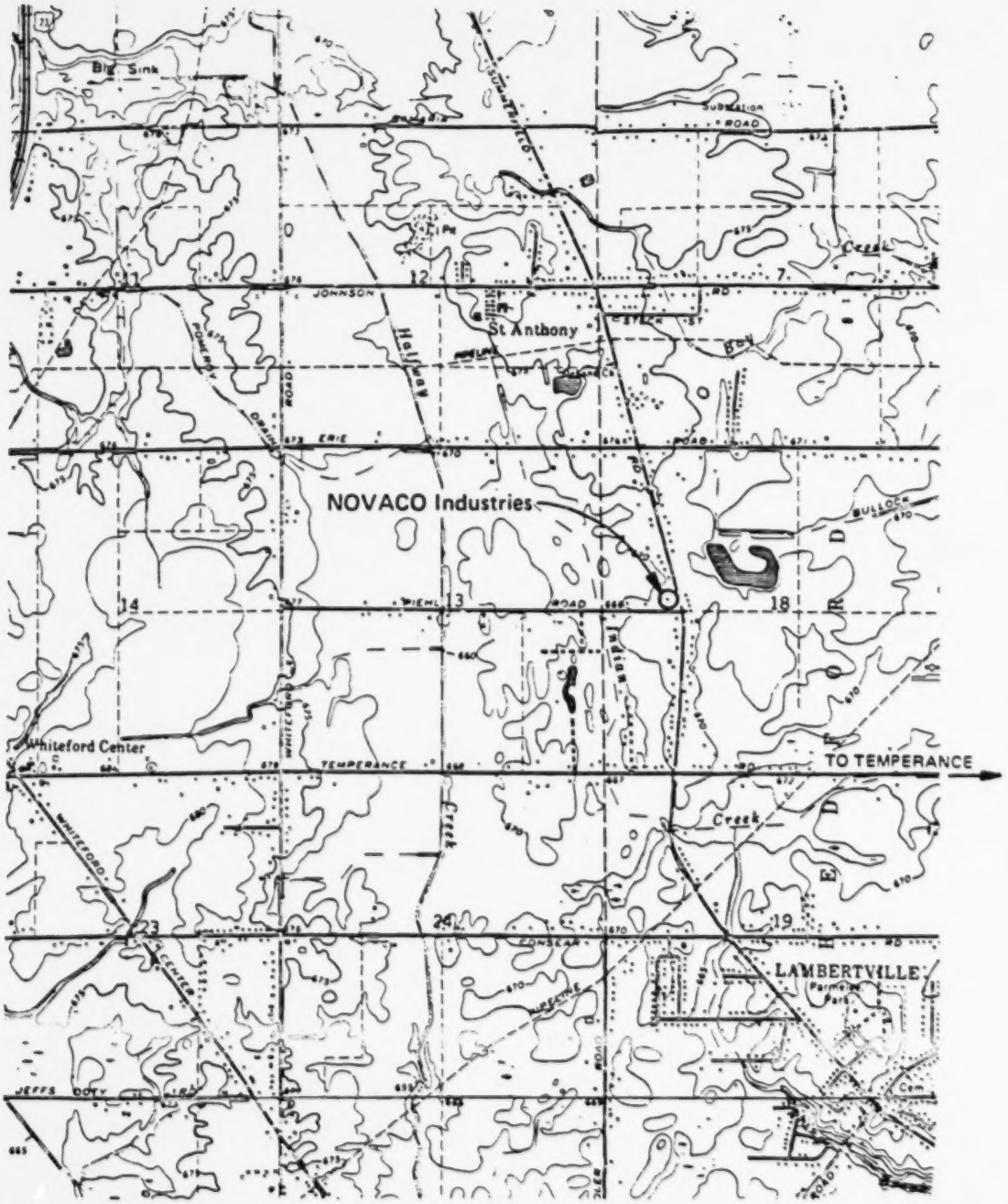
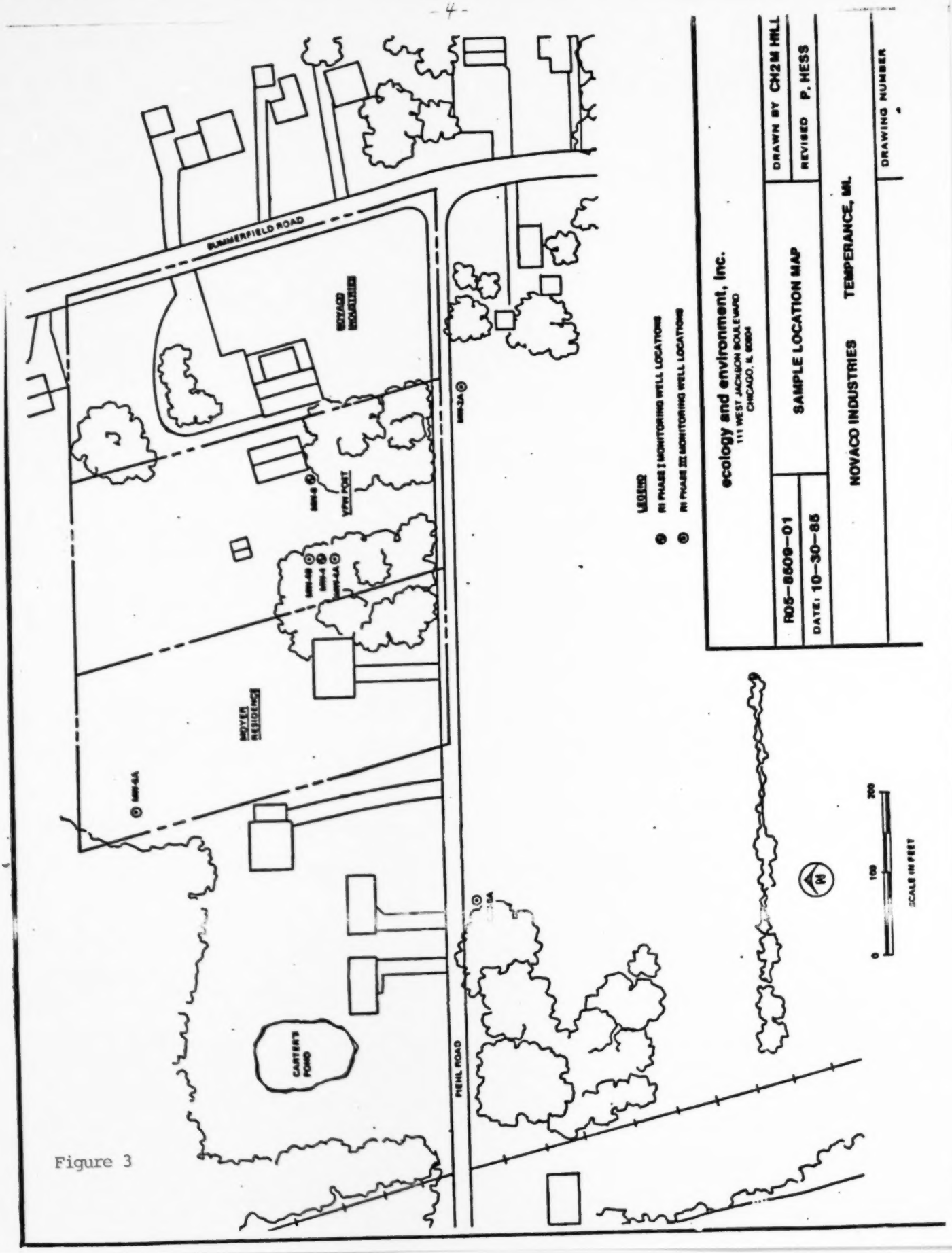


1" = APPROX. 2640'

FIGURE 2
VICINITY MAP

NOVACO INDUSTRIES FS


SUMMERFIELD ROAD
NOVACO INDUSTRIES
NOYES RESIDENCE
VFW POST
CARTER'S POND
PIEHL ROAD
MW-1
MW-2
MW-3A
MW-4A
MW-4B
LEGEND
RI PHASE I MONITORING WELL LOCATIONS
RI PHASE III MONITORING WELL LOCATIONS
ecology and environment, inc.
111 WEST JACKSON BOULEVARD
CHICAGO, IL 60604
SAMPLE LOCATION MAP
R05-8509-01
DATE: 10-30-85
NOVACO INDUSTRIES TEMPERANCE, MI.
DRAWN BY CH2M HILL
REVISED P. HESS
DRAWING NUMBER
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SCALE IN FEET

Figure 3

From 1979 until 1981, the Michigan Department of Natural Resources (MDNR) and the Monroe County Health Department monitored the groundwater. No additional wells were found to be contaminated during that period, and chromium concentrations in the three wells mentioned above, generally declined. However, hexavalent chromium concentrations were measured up to 940,000 micrograms per liter (ug/l) during this time. The Federal drinking water Maximum Contaminant Level for chromium is 50 ug/l.

Novaco Industries, Inc. was dissolved by the Michigan Department of Commerce on July 23, 1983. It is believed that Novaco transferred its assets to Bedford Industries, Inc. in 1985, which in turn has leased the land and building to TMI Industries, Inc. The operators of TMI, Inc. are Terry and Glen Parsil and Darryl Brooks, all former Novaco employees and/or officers. For the duration of this study, the site will continue to be called Novaco Industries.

Current Site Status

Novaco Industries was placed on the National Priorities List (NPL) in September 1983, in group 7. The Remedial Investigation (RI) field work was conducted during 1984 and 1985. The study included an electromagnetic survey, installation of 16 monitoring wells, analyses of soil samples from three soil borings, and implementation of a groundwater sampling program using the newly installed monitoring wells and existing domestic wells. The sampling programs were conducted in April 1984 (Phase I); December 1984 (Phase II); June 1985 (Phase III); and September 1985 (Phase IV).

The electromagnetic survey conducted in January and February 1984 failed to identify a contaminated plume at the Novaco Industries study area because very dense cultural disturbances (such as well casings, overhead powerlines, and fences) contributed to false above-ground electromagnetic measurements. Measurements away from the disturbances did not detect a plume moving offsite.

Surface water sediment samples were taken during Phase I from Fishers Pond and Hickey's Pond, near the site. Sediment samples were taken during Phase II from Indian Creek and Carter's Pond, also near the site. Soil borings on and around the site were taken during these same time periods. These samples were analyzed for hexavalent and total chromium. No hexavalent chromium concentrations were detected. Total chromium concentrations were detected below the typical background level of most soils of 100 parts per million (ppm).

Groundwater samples were taken from Novaco Industries' new well on April 19, 1984, and from monitoring wells MW-7 and MW-8, and again from Novaco Industries' new well on April 24, 1984. The samples were analyzed for U.S. EPA inorganic and organic priority pollutants. No organic, pesticide, or PCB contamination was detected in the U.S. EPA organic priority pollutant analyses. Iron, manganese, and zinc were detected in all four groundwater samples, and the secondary drinking water standards for these metals were exceeded. However, because the secondary standards are based on nonhealth criteria, these metals were not addressed further as an endangerment.

Barium was detected at concentrations above the Federal primary drinking water standard in one sample collected in April 1984 (Novaco Industries' new well). Additional groundwater samples were collected from 13 monitoring wells and 8 domestic wells (including Novaco Industries' new well) in December 1984. The results from these samples indicate that barium concentrations do not exceed the Federal primary drinking water standard of 1,000 ug/l. The average concentration measured was 190 ug/l with a maximum concentration of 927 ug/l in the Moyer residence's new well.

The total and hexavalent chromium concentrations for samples collected in April and December 1984 and June and September 1985 from monitoring wells are presented in Table 1. Total chromium was detected at concentrations above the federal drinking water standard (50 ug/l) in three samples (monitoring wells MW-4, MW-7, and MW-8) collected in April 1984, in two samples (monitoring wells MW-4 and MW-8) collected in December 1984, and in two samples (monitoring wells MW-4a and MW-8) collected in June and September 1985.

The total chromium concentrations for samples collected in April 1984 from 20 domestic wells were below a detection limit of 0.5 ug/l. The total chromium concentrations for samples collected in December 1984 from eight domestic wells were below a detection limit of 8 ug/l. Detection limits in April were lower than the limits in December because different laboratory methods were used (i.e., A.A. Furnace with a detection limit for total chromium of 0.5 ug/l versus ICP with a detection limit for total chromium of 8 ug/l). The Central Regional Laboratory (CRL) generally uses the ICP laboratory method. The laboratory that analyzed the samples in April used the A.A. Furnace laboratory method.

Toxicity of Contaminant

There are two types of chromium - trivalent and hexavalent. Trivalent is the naturally occuring form of chromium and is relatively harmless. Hexavalent chromium is manmade and is toxic. Hexavalent chromium is used in various industrial processes such as plating auto parts (as was done at the Novaco facility). Evidence has shown that large doses of hexavalent chromium in drinking water can cause toxic reactions. The major human health hazard from hexavalent chromium comes from ingestion, although it has been observed to cause lung cancer and a variety of respiratory complications in humans after it has been inhaled. Since the path of exposure is through the groundwater, the greatest threat to human health is through ingestion.

Threat to Public Health

The chromium contamination plume migrated west under the VFW Post and the Moyer properties. The contamination appears restricted to the upper aquifer sand and gravel/weathered limestone zones. The vertical distribution of the plume appears to be relatively even throughout this area. Monitoring wells and residential wells in the deep aquifer have not shown any concentrations of chrome; however, the potential exists for the plume to leak into the deeper aquifer and contaminate the drinking water supply.

Table 1
CHROMIUM CONCENTRATIONS IN REMEDIAL
INVESTIGATION MONITORING WELLS

Monitoring Well Number	Date Sampled	Total Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-1	4/23/84	41	10 U
	12/19/84	8 U	10 U
	6/11/85	0.5 U	10 U
MW-2	4/23/84	4	10 U
	12/18/84	9	10 U
	6/12/85	0.5 U	10 U
MW-2a	6/13/85	0.5 U	10 U
	9/27/85	0.5 U	10 U
MW-3	4/23/84	3	10 U
	12/18/84	8 U	10 U
	6/11/85	0.5 U	10 U
MW-4	4/23/84	610	320
	12/19/84	1,640	1,930[a]
	6/11/85	0.5 U	10 U
	9/27/85	2.3	10 U
MW-4a	6/13/85	190	190
	9/27/85	420	430
MW-4b	6/13/85	0.5 U	10 U
	9/27/85	0.5 U	10 U
MW-5	4/24/84	2 U	10 U
	12/18/84	11	10 U
	6/11/85	0.5 U	10 U
MW-5a	6/13/85	0.5 U	10 U
	9/27/85	0.5 U	10 U
MW-6	4/24/84	2 U	10 U
	12/18/84	8	10 U
	6/12/85	0.5 U	10 U
MW-6a	6/25/85	3.3	10 U
	9/27/85	0.5 U	10 U
MW-7	4/24/84	91	10 U
	12/19/84	8	10 U
	6/13/85	0.5 U	10 U
MW-8	4/24/84	1,680	1,500
	12/19/84	3,220	2,760
	6/13/85	200	190
	9/27/85	370	340
MW-9	12/19/84	8 U	10 U
	6/12/85	0.5 U	10 U
MW-10	12/18/84	10	10 U
	6/11/85	0.5 U	10 U
MW-11	12/19/84	8 U	10 U
	6/12/85	0.5 U	10 U
MW-12	12/18/84	8 U	10 U
	6/12/85	0.5 U	10 U
MW-13	12/19/84	8 U	10 U
	6/11/85	0.5 U	10 U

[a]Total and hexavalent chromium concentrations are accurate with limits of 90 to 110 percent.

Note: U indicates compound was analyzed for, but not detected. The value is the minimum detected limit for the sample analyzed.

Alternative Evaluation

A Feasibility Study (FS) of proposed remedial actions for the Novaco Industries site was completed by CH_2M Hill and submitted for public review and comments on May 9, 1986. This is a Federal-lead, final remedy project, being conducted with the cooperation of the State of Michigan Department of Natural Resources. The following site-specific goals were developed as a result of the study.

- Minimize threats from and adequately protect against the spread of contaminated groundwater from the sand/gravel aquifer.

- Adequately protect against current or future contact with and ingestion of contaminated groundwater.

Seven remedial action alternatives were developed based on these goals, and in accordance with the NCP. The NCP requires alternatives be developed that fall into remedial action categories which meet varying degrees of applicable federal law or policy. The categories include:

1. Alternatives that treat or dispose of hazardous substances at an offsite facility.

2. Alternatives that attain applicable or relevant federal public health or environmental standards, guidance, or advisories.

3. Alternatives that exceed applicable or relevant federal public health or environmental standards, guidance, or advisories.

4. Alternatives that prevent or minimize present or future migration of hazardous substances and protect human health and the environment, but do not attain the applicable or relevant federal public health or environmental standards, guidance, or advisories.

5. The "no action" alternative.

The seven alternatives assembled for screening are listed in Table 2.

Table 2

Alternative 1:	No Action
Alternative 2:	Groundwater Monitoring and Alternative Water Supply
Alternative 3:	Groundwater Extraction to Drinking Water Standards with Onsite Treatment and Discharge
Alternative 4:	Groundwater Extraction to Drinking Water Standards with Offsite Disposal.

Alternative 5:	Groundwater Extraction to Drinking Water Standards with Onsite Treatment and Discharge and Vertical Barrier Installation
Alternative 6:	Groundwater Extraction to 6 ug/l with Onsite Treatment and Discharge
Alternative 7:	Groundwater Extraction to 6 ug/l with Offsite Disposal

The alternatives were screened for technical feasibility, environmental and public health impacts, and costs. After this initial screening, alternative 5 was eliminated because it did not provide greater protection to public health and the environment and cost about twice as much as the other alternatives. Alternatives 6 and 7 were eliminated because they are similar to alternatives 3 and 4 except for different levels of cleanup. Alternatives 3 and 4 were redefined to achieve below drinking water standards for the following reasons.

- The State of Michigan standards for groundwater are more restrictive than the federal RCRA standard. Michigan sets forth a water quality standard of 50 ug/l (which is the same as the Federal Standard), but in addition the State of Michigan is authorized to require cleanup to background (less than 0.5 ug/l for total dissolved chromium at Novaco Industries). It is important to cleanup to below drinking water standards because the standards do not differentiate between total and hexavalent chromium.

- The additional cost to clean up the aquifer to below 50 ug/l is very small (slightly more than 10 percent) compared to the initial cost to clean up the aquifer to 50 ug/l.

- In view of the extreme variability of the sand/gravel aquifer in both horizontal and vertical directions, it would be prudent to establish a cleanup target that is less than 50 ug/l to provide a "safety factor" so that the aquifer is likely to be cleaned up in all areas to at least 50 ug/l.

It is difficult to quantify a specific cleanup level for total chromium that is significantly lower than 50 ug/l because the groundwater models are limited in their ability to make accurate predictions for very low concentrations of chromium. This is due to uncertainties associated with the models assumptions.

Rather than targeting a specific cleanup level that technology cannot be relied upon to detect, a more reasonable cleanup objective would consist of a series of milestones as described below:

- Milestone No. 1: The extraction well system would be operated until 50 ug/l (or lower) total dissolved chromium is achieved in every monitoring well and extraction well.

- Milestone No. 2: The extraction well system may be operated to remove a second volume of groundwater equal to the volume of groundwater removed to achieve Milestone No. 1, or until non-detectable total chromium concentrations (5 ug/l) are achieved in every monitoring well and extraction well, whichever comes first.

- Milestone No. 3: The extraction well system may be operated for an additional period of time depending on the performance of the extraction well system in achieving Milestones No. 1 and 2. U.S. EPA and MDNR would participate in the decision to continue pumping. For both alternative 3 and 4, groundwater monitoring would continue beyond the extraction period in Milestone 2. The extraction wells, pumps, and treatment plant would remain in place for an additional period of time in the event that chromium concentrations rise or new contamination is discovered.

Alternatives 3 and 4 incorporate this milestone approach to aquifer cleanup. Alternatives 1, 2, 3 and 4 were evaluated in detail in the FS [consistent with 40 CFR Part 300.68(i)].

The detailed assessment evaluated more specifically the public health and environmental considerations, institutional considerations, and costs and technical considerations. The technical evaluation includes performance, reliability, implementability and safety.

Alternative 1: No Action

The "no action" alternative would not require any work to be done at the site. This alternative would not protect public health and the environment because it would leave a potential for further contamination of residential wells.

Cost for Alternative 1 - No Action

Capital	N/A
O&M	N/A
Present Worth	N/A

Alternative 2: Groundwater Monitoring and Alternative Water Supply

Alternative 2 includes groundwater monitoring and installation of an alternative water supply to residents whose wells become contaminated in the future and measure total chromium concentrations over 50 ug/l. The alternative water supply would be a public well system, shared private wells or private wells. All affected homes would be served. Contaminated wells would be abandoned. Groundwater monitoring would be required for a 30-year period, every six months.

Although the alternative would provide affected residences with a new public well/private well system it would do nothing to remove the chromium from the sand/gravel aquifer nor would it prevent the possible migration of contaminated groundwater into the limestone aquifer.

A public well/private system is a proven technology. The wells are easily installed and construction would take a few days per well. The alternative would not meet the maximum concentration limits for groundwater protection under RCRA nor would it meet the U.S. EPA Groundwater Protection Strategy (GWPS). This is because contamination determined to be a hazardous waste as a result of a chemical spill must be managed in accordance with RCRA. The maximinum contamination for chromium under RCRA is 50 ug/l, which is the same as the Federal drinking water standard. The GWPS classifies the contaminated aquifer as Class II. Groundwater cleanup of a Class II aquifer is subject to current requirements under RCRA.

In addition, the alternative would not meet the Michigan Water Resources Commission Act 245. This Act establishes water quality standards and gives the State of Michigan the authority to maintain groundwater quality through issuance of an NPDES permit. It also requires cleanup of groundwater to a level which meets their "non-degradation" policy. Degradation is defined as a change in groundwater quality from local background conditions. Under authority of this act, the MDNR could determine that the groundwater at the site does not meet the standards of the act and require cleanup to background levels.

Cost for Alternative 2: Groundwater Monitoring and Alternative Water Supply

Capital	$ 5,000
*O&M	8,000 - 23,000
Present Worth	97,000

Alternative 3: Groundwater Extraction to Below Drinking Water Standards with Onsite Treatment and Discharge

Contaminated groundwater would be extracted from the sand/gravel aquifer until total chromium concentrations remaining in the aquifer are below the drinking water standard of 50 ug/l. The extracted water would be treated onsite by electrochemical reduction/ion exchange polishing and then discharged to Indian Creek. Alternative 3 includes groundwater extraction, onsite treatment and disposal, groundwater monitoring and the abandonment of monitoring wells. Sludge left over from the treatment process is assumed to be hazardous and requires disposal in a hazardous waste landfill subject to RCRA compliance. Sampling of the sludge will determine if it is hazardous. The alternative would incorporate the milestone schedule.

Electrochemical reduction primary treatment would effectively remove hexavalent chromium from the extracted groundwater to concentrations below 50 ug/l and trivalent chromium concentrations to below 100 ug/l. Ion exchange polishing would further reduce the hexavalent chromium concentrations to below 6 ug/l. This would remove the threat to public health and the environment.

* O & M costs are expected to vary over a period of several years; therefore, a range from the lowest cost to the highest cost is included in all cost tables.

Groundwater extraction wells are commonly used to remove contaminants from aquifers at hazardous waste sites. Onsite treatment by electrochemical reduction is a proven and reliable technology. Extraction wells and the onsite treatment plant are easily installed. The construction time is estimated to be 1 to 3 months. Groundwater extraction would occur over a 3 to 4 year period. The groundwater quality in alternative 3 would meet the maximum concentration limit for chromium under RCRA which is the same as the drinking water standard. The alternative would also meet GWPS water goals.

Discharge to Indian Creek must meet the technical requirements of the NPDES program. The Michigan DNR has indicated they will issue a Michigan Pollutant Discharge Elimination System (MPDES) permit to themselves to cover this action at Novaco. It appears that the proposed discharge should meet the discharge requirements. In addition, construction of the header pipe and discharge pipe will require a quarry permit to authorize excavation, and construction of the outfall structure in Indian Creek would require a dredge and fill permit.

The Water Resources Commission Act 245 and the Michigan Environmental Protection Act 127 give the MDNR authority to require cleanup of the groundwater to achieve certain groundwater quality standards. Act 127 states that no one shall pollute, impair, or cause harm to the environment. The State has the authority to determine if allowing the contaminated groundwater to remain at the site would be inconsistent with this Act. Under this alternative the total chromium concentration in the groundwater would be reduced to below 50 ug/l. It is expected that MDNR will interpret these acts to require clean-up to background water quality conditions and find the proposed cleanup insufficient without the Milestone approach.

Cost for Alternative 3: Groundwater Extraction to Below Drinking Water Standards with Onsite Treatment and Disposal

Capital	$560,000
O&M	8,000-95,000
Present Worth	$887,087

Alternative 4: Groundwater Extraction to Below Drinking Water Standards with Offsite Disposal

Alternative 4 would clean up the aquifer to below drinking water standards. Contaminated groundwater would be extracted from the sand/gravel aquifer until total chromium concentrations remaining in the aquifer are below the drinking water standard of 50 ug/l. The extracted water would be disposed of at the South Monroe County WWTP through a force main. Alternative 4 includes groundwater extraction, offsite disposal, groundwater monitoring and the abandonment of monitoring wells. The alternative would incorporate the milestone schedule. The groundwater extraction system would be the same as for alternative 3, affording the same protection.

Groundwater extraction wells are commonly used to remove contaminants from aquifers at hazardous waste sites and installation of a sewer is a proven and reliable technology. The wells and sewer are easily installed with construction time of about 6 months.

The extracted groundwater would be disposed of through a force main at the South Monroe County WWTP in Bedford Township. If alternative 4 is selected, several problems and potential sources of additional costs arise. First, the hexavalent chromium concentrations in the extracted groundwater are expected to exceed The Monroe Metropolitan Water Pollution Control System Industrial Pretreatment Standard of 5 ug/l. U.S. EPA would be required to obtain a waiver from this regulation in implementing this remedy. Furthermore, the WWTP does not want to accept this waste because the contaminated water may affect their sludge management program. Presently the plant receives little industrial waste and consequently produces a sludge that is used for cropland application. Whereas the chromium contributed by the groundwater pumping program is not expected to render the sludge hazardous, it may warrant re-evaluation of the practice of cropland disposal. Although this alternative appears less expensive than alternative 3, there are hidden costs. If Bedford township needs to change their sludge management practice as a direct result of accepting the waste from the Novaco site, they would require a written guarantee from U.S. EPA that the agency would pay for such a program and a cash bond to support the guarantee.

The groundwater quality in alternative 4 would meet the maximum concentration limit for chromium under RCRA which is the same as the drinking water standard. The alternative would also meet GWPS water goals.

The Water Resources Commission Act 245 and the Michigan Environmental Protection Act 127 apply the same as for alternative 3.

Cost for Alternative 4: Groundwater Extraction to Below Drinking Water Standards with Offsite Disposal

Capital	$560,000
O&M	8,000-23,000
Present Worth	$433,065

Consistency with Other Environmental Laws

There are four laws and policies that address existing conditions, rather than proposed actions, which apply to alternatives 1 and 2. RCRA is not applicable to the Novaco Industries study area because the spill of chromic acid occurred before RCRA came into effect, and the tank from which the material was spilled has been removed and it was not a regulated treatment, storage, or disposal unit under RCRA. Even though RCRA may not be applicable it is relevant to Novaco because it identifies maximum concentrations for constituents in groundwater. The maximum concentration for chromium under RCRA is 50 ug/l, which also is the drinking water standard. The no action and the groundwater monitoring and alternative water supply alternatives would not be in compliance with the concentration limits required under RCRA. Alternatives 1 and 2 would not be in compliance with the GWPS because there would not be any cleanup either to drinking water standards or background.

Although not "relevant or applicable" under the NCP, there are state and local laws and regulations affecting the Novaco site. The Michigan Environmental Protection Act 127 as previously stated, is a general act stating that no one

shall pollute, impair, destroy, or otherwise cause harm to the environment. This act can be interpreted broadly and the MDNR may conclude that the Novaco Industries study area violates this act because the contaminated groundwater impairs, destroys, or otherwise causes harm to the environment.

The Water Resources Commission Act 245 authorized the adoption of water quality standards to be met in all state waters (including groundwater). The water quality standard to be maintained in groundwater is based on a policy of "nondegradation." Degradation is defined as a change in groundwater quality from local background conditions. Under the authority of the Water Resources Commission Act, the MDNR could determine that the groundwater at the site does not meet the standards of the act and require cleanup to background levels. Alternatives 1 and 2 could be in violation of these two Acts.

In addition to these regulations, the State Public Health Code (administered by Monroe County), which regulates construction of drinking water wells, would apply to alternative 2. This regulation would require special construction procedures for wells built in contaminated areas.

Alternatives 3 and 4 would be in compliance with RCRA and GWPS as stated above. Both alternatives may be required to be in compliance with the Michigan Environmental Protection Act 127, and Water Resources Commission Act 245. Discharge into Indian Creek in alternative 3 would be regulated through an NPDES permit by the MDNR and Federal ambient water quality criteria. The extracted groundwater under alternative 4 would be discharged by a force main and existing sewer to the South Monroe County WWTP. All discharge to the sewer system is required to meet the pretreatment standards established by the Monroe Metropolitan Water Pollution Control System. Alternative 4 would be in violation of these standards.

Selection Process

Alternatives 1 and 2 would do nothing to remove or treat the contaminated groundwater but would rely on the natural processes of chemical reduction and dilution in continuing to decrease the chromium concentrations in the sand/gravel aquifer. It has been estimated that background concentrations (i.e., less than 0.5 ug/1) might be reached in 13 to 18 years. Provisions are included in alternative 2 to provide residences with new wells should their existing wells become contaminated in the future.

The major health concern associated with both Alternatives 1 and 2 is that hexavalent chromium might migrate downward from the sand/gravel aquifer into the limestone aquifer. Presently, the limestone aquifer contains no detectable chromium. Most residential wells in the vicinity of Novaco Industries draw from the limestone aquifer. The potential for cross-contamination between the aquifers exists since there is no extensive clay layer present beneath the Novaco Industries study area and a downward hydraulic gradient exists. Additional potential impacts of alternatives 1 and 2 are that surface water quality and aquatic life may be adversely affected should contaminated groundwater migrate into Indian Creek, and that restrictions may need to be placed on the locations of future residential wells. Also, alternatives 1 and 2 would not meet applicable federal and state regulations including RCRA, the U.S. EPA GWPS, Michigan Environmental Protection Act 127, and the Michigan Water Resources Commission Act 245. For these reasons, alternatives 1 and 2 were eliminated.

Alternatives 3 and 4 would clean up the sand/gravel aquifer by extracting groundwater and then either treat the extracted groundwater onsite with discharge to Indian Creek (Alternative 3) or dispose of the untreated, extracted groundwater to the South Monroe County Wastewater Treatment Plant (WWTP) (Alternative 4). The time required for either alternative 3 or 4 to clean up the aquifer is estimated at 3 to 4 years.

Both alternatives remove chromium from the groundwater and achieve the same level of cleanup within the same time frame. Alternatives 3 and 4 also provide the treatment and disposal of extracted groundwater using technologies that are reliable and protective of public health and the environment.

Alternative 4 has a disadvantage in that the initial maximum expected discharge concentration for hexavalent chromium exceeds WWTP's pretreatment standard (i.e., 800 ug/l versus 5 ug/l allowable). Furthermore, the WWTP officials have stated objections to receiving extracted groundwater from the Novaco Industries site, because the additional chromium waste load might adversely impact South Monroe County's WWTP's current practice of disposing of its sludge on croplands. See Table 3 for a cost summary.

Recommended Alternative

The National Oil and Hazardous Substances Contingency Plan (NCP) [40 CFR Part 300.68(j)] states that the appropriate extent of remedy shall be determined by the lead agency's selection of the remedial measure which the agency determines is cost-effective (i.e., the lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment). Based on the evaluation of the cost and effectiveness of each proposed alternative, the comments received from the public and the MDNR, the following alternative has been determined to be cost-effective as defined by the NCP:

Alternative 3: Groundwater Extraction to Below Drinking Water Standards with Onsite Treatment and Disposal.

An extraction wellfield, a treatment plant consisting of electrochemical reduction, precipitation, filtration, and ion exchange polishing units, and a pipeline to convey treated groundwater to Indian Creek would be constructed onsite and on the adjoining properties. Approximately 36 million gallons of contaminated groundwater would be extracted from the sand/gravel aquifer over a 4-year period. The extracted groundwater would be treated onsite to remove trivalent and hexavalent chromium and would then be discharged into Indian Creek, applying the milestone approach.

Alternative 3 will provide several benefits including:

- Removal of chromium contamination in the sand/gravel aquifer, thus protecting the lower limestone aquifer
- Cleanup time of approximately 4 years

Table 3

Cost Summary

Alternative	Capital Costs	O&M	Present Worth
1. No Action	- 0 -	- 0 -	- 0 -
2. Groundwater Monitoring and Alternative Water Supply	$ 5,000	$112,000/20 yrs	$ 97,000
3. Groundwater Extraction to below Drinking Water Standards with Onsite Treatment and Disposal	560,000	419,000/6 yrs	887,000
4. Groundwater Extraction to below Drinking Water Standards with Offsite Disposal	264,000	183,000/6 yrs	433,000

- Elimination of the potential for residential ingestion of contaminated groundwater
- Elimination of the need to place restrictions on future well construction
- Compliance with applicable federal, state, and local regulations including RCRA, the U.S. EPA draft GWPS, Water Resources Commission Act 245, Michigan Environmental Protection Act 127, NPDES permit, and ambient water quality criteria.

The capital cost of this alternative is $560,000. The State of Michigan agrees to contribute ten percent of the remedial action.

Alternative 3 and 4 afford the same protection but alternative 4 would be in violation of the WWTP's pretreatment standards. U.S. EPA would be required to obtain a waiver from the WWTP standards if alternative 4 were selected. Such a waiver is likely to be opposed by WWTP officials who are not presently willing to accept the extracted groundwater due to its impact on their sludge management program. Finally, U.S. EPA is developing policy proposing that CERCLA discharges to a WWTP should be in full compliance with CWA, RCRA and any other relevant or appropriate environmental statutes, or should not occur.

Operation and Maintenance

The primary O&M expenses for alternative 3 include groundwater monitoring, groundwater extraction onsite treatment, and well abandonment of 15 monitoring wells. Annual O&M costs are based on 50-gpm flow, 24 hour per day, 365 days per year. Table 4 shows the breakdown of O&M costs.

Community Relations

Copies of the FS were made available to the public on May 9, 1986. The Monroe County Health Department and the Bedford Township Municipal Building served as repositories for this document. The MDNR issued a press release in the Monroe Evening News and the Toledo Blade announcing the dates of the public comment period and the public meeting.

The public meeting was held on May 13, 1986, at the VFW Hall in Lambertville, Michigan. Approximately 30 residents attended the meeting. Representatives of the U.S. EPA, MDNR, MCHD and CH_2M Hill were present.

The citizens took an active role in the meeting. Their main concern was the potential for their drinking water to become contaminated. They were also very concerned about funding and what they as citizens, could do to encourage the reauthorization of the Superfund Law. The residents are most anxious for EPA to begin the remedy process at Novaco Industries.

Other issues raised were the effect of the site on their property value and who would pay for the cleanup. It was requested at the meeting to include the Monroe County Public Library, Bedford Township Branch, as a repository since it is open in the evening. This was done immediately.

Table 4

Onsite Treatment (Alternative 3)	
Labor	$48,000
Material	6,000
Sludge Disposal[a]	3,000
Power	7,000
Backwash Disposal	16,000
	$80,000
Groundwater Extraction	
Monitoring (seven points)	$6,000
Power	1,000
	$7,000
Groundwater Monitoring	
	$8,000
Abandon Monitoring Wells	
	$15,000*

Currently CERCLA requires that the U.S. EPA pays 90 percent of O&M for the first year. Reauthorization may require the agency to pay 90 percent of O&M expenses for the first five years.

[a] Sludge assumed to be hazardous and would require special handling and offsite disposal.

*After 6 years.

Although many concerns were presented and questions asked, formal comments, either verbal or written, were not submitted. Because of this, a responsiveness summary does not accompany this document.

Enforcement

A preliminary search for responsible parties revealed that Novaco Industries is now defunct. The details of the transfer of its assets (and liabilities) are as yet unknown, but the property is presently owned by Bedford Industries, which in turn leases it to TMI Industries, Inc.

The U.S. EPA sent out Notice and Information Request letters on November 7, 1985 to identified Potentially Responsible Parties (PRPs). Two letters were returned unclaimed and responses were not received from the other two. Letters were sent to: (1) Darryl Brooks, former principal of Novaco Industries; (2) Novaco Industries, Inc.; (3) TMI Industries, Inc.; and (4) Robert Manion, Registered Agent for Bedford Industries and TMI Industries. Darryl Brooks contacted U.S. EPA in late February, 1986, requesting a meeting to discuss activities at the site. A meeting was set for March 3, 1986 in Chicago, but Mr. Brooks failed to attend. There has been no further contact with him despite repeated attempts.

Due to the unwillingness of the PRPs to respond to U.S EPA inquiries, it is recommended that Superfund monies be obligated for the site so that remedial measures may be undertaken.

*Schedule

Complete Enforcement Negotiations	04/30/86
Approve Remedial Action	06/27/86
Award IAG Contract for Design	07/01/86
Start Design	07/01/86
Complete Design	04/01/87
Award IAG Contract for Construction	04/01/87
Start Construction	05/01/87
Complete Construction	05/01/91

*The current schedule will be effective if funds are available for this site pending reauthorization. If funds are not available, a new schedule will be developed.

Future Actions

Groundwater Monitoring will continue two years after extraction is complete. Fifteen monitoring wells will be abandoned.